

Customer No.: 31561
Application No.: 10/604,980
Docket No.: 9436-US-PA

REMARKS

Present Status of the Application

Claims 17-24 are withdrawn from consideration. The Office Action rejected claims 1-16. Specifically, the Office Action also rejected claims 1-5, 7 under 35 U.S.C. 103(a) as being unpatentable over Moon (U.S. 6,683,668) in view of Yoo (U.S. 2001/0028071). The Office Action also rejected claims 8-13 and 15-16 under 35 U.S.C. 103(a) as being unpatentable over Moon (U.S. 6,683,668) in view of Yoo (U.S. 2001/0028071) and further view of Wei (US 5,156,986). No claim has been amended, and claims 1-16 remain pending in the present application, and reconsideration of those claims is respectfully requested.

Discussion of Office Action Rejections

Applicants respectfully traverse the rejection of claims 1-5, 7 under 103(a) as being unpatentable over Moon (U.S. 6,683,668) in view of Yoo (U.S. 2001/0028071) because a prima facie case of obviousness has not been established by the Office Action.

To establish a prima facie case of obviousness under 35 U.S.C. 103(a), each of three requirements must be met. First, the reference or references, taken alone or combined, must teach or suggest each and every element in the claims. Second, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references in a manner resulting in the claimed invention. Third, a reasonable expectation of success must exist. Moreover, each of the three

Customer No.: 31561
Application No.: 10/604,980
Docket No.: 9436-US-PA

requirements must "be found in the prior art, and not be based on applicant's disclosure." See M.P.E.P. 2143, 8th ed., February 2003.

The present invention is in general related a method of forming a pixel structure as claim 1 recites:

Claim 1. A method of forming a pixel structure, comprising the steps of:
forming a gate and a scan line having connection with the gate over a substrate;
forming an insulation layer over the substrate covering the gate and the scan line;
forming a channel layer over the insulation layer above the gate;
forming source/drain terminals over the channel layer and a data line having connection with one of the source/drain terminals over the insulation layer, wherein the gate, the channel layer and the source/drain terminal together constitute a thin film transistor;
forming a passivation layer over the substrate covering the thin film transistor;
forming a photoresist layer over the passivation layer;
conducting a back exposure process using the source/drain terminals, the scan line and the data line as a mask and chemically developing the photoresist layer to form a patterned photoresist layer;
etching the passivation layer and the insulation layer using the patterned photoresist layer as an etching mask to expose a sidewall of the source/drain terminal;
removing the patterned photoresist layer; and
forming a pixel electrode over the passivation layer, wherein the pixel electrode and the drain terminal are electrically connected through the sidewall of the drain terminal.

In the Office Action, the Examiner seemed to consider Moon discloses a process to form a pixel structure, and Yoo teaches that the source/drain terminals of TFT are contact with the pixel electrode. The method to form the structure that the source/drain terminals of TFT are contact with the pixel electrode is by performing a patterning process using a PR and a back exposure, wherein the TFT acts as a mask.

Customer No.: 31561
Application No.: 10/604,980
Docket No.: 9436-US-PA

Applicants points out that, according to Yoo, the patterning process by using the PR and the back exposure is to form a pixel electrode but not for exposing the sidewalls of the source/drain terminals. Yoo discloses the back exposure is used to form a pixel electrode using a negative photoresist ([0054]). In details, as disclosed in paragraph [0055], Fig. 8 is similar Fig. 6C and shows a step of *forming a pixel electrode using the PR*. Therefore, after depositing a transparent conductive material such as ITO or IZO and then sequentially depositing the PR, the back exposure is performed. And thus, the transparent conductive material 115 over the PAI pattern is etched because the PAI pattern acts as a mask in the back exposure process. In other words, the step of forming the PR layer and the back exposure are performed after the transparent conductive material is deposited, and the PR layer is a negative photoresist layer. Hence, the PR layer and the back exposure are used to pattern the transparent conductive material. Besides, the PR is a negative photoresist layer so that the PR layer covered by the TFT is removed after developing. Thus, the PR layer cannot be used to expose the sidewalls of the source/drains. In addition, according to Fig. 6C, the passivation layer 112 is etched to form a contact hole 110 and is divided into an etched passivation layer 112b and a residual passivation layer 112a. In Fig. 6C, the sidewalls of source/drain may be exposed. However, Yoo does not teach the step is performed by a back exposure. As shown in Fig. 6D, the pixel electrode 114 contacts the drain electrode 108 via the drain contact hole 110 (in paragraph [0049]).

Therefore, Yoo fails to teach or suggest at least the step of back exposure process as recited in claim 1. Applicant respectfully submits that independent claim 1 patently define over

Customer No.: 31561
Application No.: 10/604,980
Docket No.: 9436-US-PA

the prior art references, and should be allowed. For at least the same reasons, dependent claims 2-5, 7 patently define over the prior art as well.

Applicants respectfully traverse the rejection of claims 8-13, 15-16 under 103(a) as being unpatentable over Moon (U.S. 6,683,668) in view of Yoo (U.S. 2001/0028071) and further view of Wei (US 5,156,986) because a prima facie case of obviousness has not been established by the Office Action.

Applicants first submit that, as disclosed above, the references of Moon and Yoo combined fail to teach or suggest each and every element of claim 1 from which claim 8 depend. Wei does not teach or suggest the back exposure process as above discussed, and thus Wei cannot cure the deficiencies of Moon and Yoo. Therefore, independent claim 1 is patentable over Moon, Yoo and Wei. For at the least the same reasons, its dependent claim 8 is also be patentable.

In addition, independent claim 9 recites:

Claim 9. A method of forming a pixel structure, comprising the steps of:
forming a gate and a scan line having connection with the gate over a substrate;
forming an insulation layer over the substrate covering the gate and the scan line;
forming a channel material layer over the insulation layer;
forming a metallic layer over the channel layer;
forming a patterned first photoresist layer over the metallic layer;
patterning the metallic layer using the first photoresist layer as a mask to form a data line and a source/drain metallic layer;
patterning the channel material layer using the first photoresist layer as a mask to form a channel layer;
patterning the source/drain metallic layer using the first photoresist layer as a mask to form source/drain terminals, wherein the source terminal and the data line are electrically

Customer No.: 31561
Application No.: 10/604,980
Docket No.: 9436-US-PA

connected, and the gate, the channel layer and the source/drain terminals together constitute a thin film transistor;

removing the first photoresist layer;

forming a passivation layer over the substrate covering the thin film transistor;

forming a second photoresist layer over the passivation layer;

conducting a back exposure process using the gate, the source/drain terminals, the scan line and the data line as a mask and chemically developing the second photoresist layer to form a patterned second photoresist layer;

patterning the passivation layer and the insulation layer using the patterned second photoresist layer as a mask to expose a sidewall of the source/drain terminal;

removing the patterned second photoresist layer; and

forming a pixel electrode over the passivation layer, wherein the pixel electrode and the drain terminal are electrically connected through a sidewall of the drain terminal.

Similarly, Yoo fails to teach or suggest at least the step of back exposure process as recited in claim 9. Wei also fails to teach or suggest the back exposure process, and thus Wei cannot cure the deficiencies of Moon and Yoo. Therefore, independent claim 9 is patentable over Moon, Yoo and Wei. For at the least the same reasons, its dependent claims 10-13, 15-16 are also be patentable.

Applicants respectfully traverse the rejection of claim 14 under 103(a) as being unpatentable over Moon (U.S. 6,683,668) in view of Yoo (U.S. 2001/0028071) and further view of Wei (US 5,156,986) and Park (US 6,022,753), the rejection of claim 6 under 103(a) as being unpatentable over Moon (U.S. 6,683,668) in view of Yoo (U.S. 2001/0028071) and further view of Park (US 6,022,753) because a prima facie case of obviousness has not been established by the Office Action.

Customer No.: 31561
Application No.: 10/604,980
Docket No.: 9436-US-PA

Applicants submit that, as disclosed above, Moon and Yoo fails to teach or suggest each and every element of claims 1, 9, from which claims 6, 14 depend. Wei and Park cannot cure the deficiencies of Moon and Yoo. Therefore, independent claims 1, 9 are patentable over Moon, Yoo, Wei and Park. For at the least the same reasons, their dependent claims 6, 14 are also be pantenable.

Customer No.: 31561
Application No.: 10/604,980
Docket No.: 9436-US-PA

CONCLUSION

For at least the foregoing reasons, it is believed that the pending claims 1-16 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Date :

August 24, 2004

Respectfully submitted,

Belinda Lee
Belinda Lee

Registration No.: 46,863

Jianq Chyun Intellectual Property Office
7th Floor-1, No. 100
Roosevelt Road, Section 2
Taipei, 100
Taiwan
Tel: 011-886-2-2369-2800
Fax: 011-886-2-2369-7233
Email: belinda@jcipgroup.com.tw
Usa@jcipgroup.com.tw